

3. THE NATURE OF SOLID WASTE

It is useful to look at the nature of solid waste. Solid waste can be divided into three categories: hazardous, biodegradable and non-biodegradable, and combustible and non-combustible waste (Figure 4). Each material should be assessed individually since the nature of these characteristics leads to different types of waste management approaches.

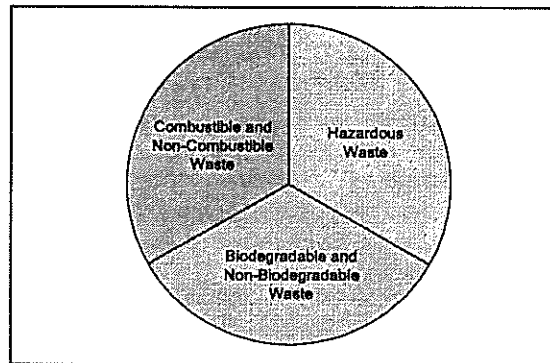


Figure 4: Types of Solid Waste

3.1 Hazardous Waste

Hazardous waste contains harmful chemicals and produces harmful by-products when burned or placed in a landfill site. Common hazardous wastes at tourism facilities include paints, cleaners, oils, batteries and pesticides, all of which can have a severe impact on the environment if left untreated. Hazardous waste requires special treatment procedures before disposal and is not appropriate for ordinary on-site treatment, placement in open landfill sites or burned in an uncontrolled manner. While some instances, hazardous waste disposal is regulated (fines are imposed for improper practices); however, in many countries, especially in more remote areas, there is often little government regulation or inspection of hazardous waste treatment.

3.2 Biodegradable and Non-biodegradable Waste

Biodegradable waste contains organic substances which can be broken down over time, treated and recycled into useful by-products such as biogas and compost; non-biodegradable waste (textiles, chemicals, rubber and plastics) do not. Biodegradation time depends on the type and nature of the substance and can range from a few weeks to many years. When wastes are placed in a covered landfill site, decomposition time can be significantly extended.

3.3 Combustible and Non-combustible Waste

Combustible waste such as paper, used oils, rubber and leather, has a high heat value, burns easily and releases heat energy when combusted. Non-combustible waste such as glass, aluminum and most organic waste (e.g. food scraps and garden trimmings) has a lower heat value and cannot be easily burned.

3.4 Examples of Solid Waste Generated by Tourist Facilities

Accommodation Sector (hotels, guesthouses)

Accommodation facilities generate various types of solid waste:

- newspapers and magazines
- cleansing agent containers used by housekeeping and laundry services
- flowers in guestrooms and public areas
- plastic shampoo and cosmetic soap bottles
- old towels, linens, bed sheets and furniture
- paint and varnishes, used fittings, fixtures and plumbing supplies, refrigerators and other bulk items.

Food and Beverage Services

Most restaurants or restaurant/bar sections of hotels, guesthouses or golf courses dispose of large quantities of solid waste including:

- empty cans, bottles, tins and glass
- food
- small non-refillable product containers (sugar, salt, pepper, flour and cream)
- paper serviettes, coasters, straws, toothpicks and cocktail napkins
- used aprons, kitchen towels and napkins.

Open Spaces and Grounds

Landscaping and gardening activities at golf courses and many hotels generate ground related solid waste including:

- plant trimmings
- empty pesticide/insecticide bottles and fertilizer packs, pesticides, insecticides and fertilizer products (which are often hazardous).

Administrative and Office Functions

A facility's main office, front desk and shipping/receiving areas create solid waste including:

- paper and envelopes
- travel pamphlets and brochures which are often quickly discarded by tourists.

4. AVOIDING SOLID WASTE

Prior to recycling, recovery, treatment or disposal the first consideration in sustainably managing solid waste is how a facility can reduce the amount and/or toxicity of materials used and generated by its operations. This calls for careful consideration before purchasing materials or services. Source reduction can save facilities money while helping the environment.

4.1 Waste Minimization

The only economically viable, long-term approach to avoiding environmentally harmful waste is to prevent its production in the first place. Waste prevention requires altering the way business is conducted and eliminating problems at the source rather than dealing with them in the future.

There are a number of ways to prevent facility waste at source including:

Accommodation

- Introducing sorting/recycling of glass, aluminum, paper and plastics from guest rooms.
- Providing bulk dispensers and eliminate the use of individual bottles and other containers.
- Returning laundered clothes to guests in reusable cloth bags/baskets thereby eliminating plastic bags.
- Offering rarely used items such as sewing kits by request only.
- Instructing housekeeping not to replace half-used rolls of toilet paper/tissue boxes and leave replacements for guests to use when required.
- Using partially used items from guestrooms in employee restrooms or donating to charities.
- Extending the lifespan of equipment by having it serviced regularly.

Case Study: Radisson Hotel – Asheville, North Carolina

At the Radisson (a 281-room hotel), guests can take part in a waste reduction program by opting to keep the same sheets/towels for more than one night. If a special card is left on the bed, the housekeeper does not change the linen. This is accompanied by the training of housekeeping staff in their primary language and trial runs to ensure procedures are understood and followed.

Results: This program saves person-hours, detergent, hot water, wear and tear on linens, washing machines and dryers. Costs have been reduced by 30% per load. According to the Rooms Division Manager of this facility, there have been 25 written compliments on the program in 8,000 room nights and only two complaints.

Additional information: N.C. Division of Pollution Prevention and Environmental Assistance (DPPEA); E-mail: nowaste@p2pays.org

Food and Beverage

- Establishing purchasing guidelines to encourage the use of durable equipment (which can be repaired easily) and high-quality, reusable products such as linens and tableware.
- Using refillable containers for such items as sugar, salt, pepper, flour, soda, syrup and cream.
- Replacing plastic/foam cups, utensils and plates with washable cups, dishes and utensils.
- Using dispensers for straws and toothpicks and avoid purchasing individually wrapped items.
- Reusing linens for aprons and kitchen towels.
- Using cloth roll towels or hand dryers instead of paper products.
- Donating unused food to local food banks or other charitable organizations.
- Offering guests the option to order half-portions of food.
- Collecting unusable food scraps and giving or selling them to local pig farmers for animal feed.

Case Study: Harvey Mansion Restaurant and Lounge – New Bern, North Carolina

The restaurant has 20 employees and 300-400 customers weekly and generates waste primarily at shipping/receiving areas and during food preparation. Raw food arrives at the restaurant packaged in cardboard, metal, glass, styrofoam and wood; beverages are in metal cans and glass bottles packed in cardboard.

Activities:

- Kitchen staff and waiters are trained to segregate recyclables.
- Meat, fish, fruit and vegetable trimmings and uneaten food are placed in plastic-lined cans and held in the walk-in freezer for pick-up by local swine farmers.
- Wooden shipping containers are taken to farmers' markets for vendor reuse.
- Styrofoam box containers are re-used in freezer storage and given to other purveyors for reshipping.
- Metal, glass, recyclable plastics and newspapers are segregated for recycling.
- Uncoated cardboard materials are broken down for weekly pick-up.
- The reverse side of printed materials is used for message paper and customer orders.
- Trade publications are distributed to local elementary schools for nutrition and art projects.

Results: Previously an 8-yard dumpster was emptied daily; now a 2-yard dumpster is emptied once weekly. These practices save money annually in dumpster rental, emptying and disposal fees.

Additional information: North Carolina Office of Waste Reduction – P.O. Box 29569, Raleigh, NC 27626-9569.

Open Spaces and Grounds

- Phasing out the use of hazardous materials where possible.
- Using organic gardening techniques and products.

Administrative and Office Functions

- Using bulletin boards for memos, pamphlets and brochures instead of circulating copies to all staff.
- Using e-mail.
- Purchasing refillable pens and toner cartridges.
- Using shredded paper instead of bubble wrap or foam for packaging purposes.

4.2 Green Purchasing

Green purchasing is increasingly seen as an important approach to waste management. Purchasing "green" products makes good business sense since it can save money, addresses the problems of persistent toxic substances in the environment, conserves natural resources, reduces the quantity of solid waste generation and saves energy and resources in dealing with waste. There are three main dimensions that green purchasing policies should address when making purchasing decision including:

The environmental qualities of products

- Products should release no persistent toxic substances into the environment during production process, use and disposal.
- It should conserve energy and resources during production, use and disposal.
- Choose products that contain little or no toxic substances to avoid any harm to humans and the environment.
- Consider the life cycle cost of products.
- Substitute non-toxic cleaning products and try alternative methods of pest control.

The recycling and reuse quality of products

- Give preference to products made from recycled materials or renewable resources used in a sustainable way. Items with a recycled content include paper, packaging materials, plastic, glass and metal.
- Buy reusable products (i.e. refillable pens and pencils, cloth wipers and other linens, reusable mugs and other dishes) as opposed to those that can only be used once.
- Choose products that are easily recycle or composted, or are truly biodegradable.

Products that used minimal packaging

- Packaging for the product is minimal but adequate to ensure protection.
- Purchase items shipped in bulk to avoid individual wrapping of items.
- Purchase from suppliers that are committed to the environmental improvement to encourage the use of green products.
- Minimize non-recyclable packaging. Chicken, fish, and vegetables are often packaged in waxed cardboard. Facilities can reduce waste by asking vendors to pack materials in reusable or recyclable containers.

Although green purchasing has a number of advantages there are also some obstacles including a lack of choice of environmental alternatives, at times significantly higher costs in some products, conflicting and confusing information on product labels and advertising, and the lack of understanding of staff, especially in the purchasing

department, of the facility. It is important to provide adequate information about green purchasing and its importance to the staff since they are directly involved in the procurement of goods and services. Encouraging and supporting employees to search for products that meet the specifications can also help in the success of the green purchasing program. More information on green purchasing can be found at http://www.iclei.org/europe/ecoprocure/info/gpg/GPG_fullversion.pdf.

Case Study: Sheraton Rittenhouse Square Hotel, Philadelphia, USA

Starwood Hotels and Resorts opened their first 'eco-smart' hotel in the US with the hotel procuring several 'Green Products' in order to maintain a healthy internal environment. Some of the features that were incorporated are:

- A challenge to builders and suppliers to review how their products and services are produced, packaged and delivered in order to create a more environmentally product.
- All paint, wallpaper, carpets and curtains are free of toxic chemicals.
- Wooden furniture is painted with catalytic varnish through which harmful chemicals cannot penetrate.
- Bamboo, a sustainable product, was used on the walls of the lobby area.
- Recycled materials feature strongly in the design process. For example 93% recycled granite was used for the lobby flooring; bed side tables were made from recycled wooden shipping pallets and the room number signs and parts of the lobby floor and front desk were fabricated from recycled glass.
- Beds are 'organic sleep systems' comprising of organic cotton and wool produced without any toxic bleaches or dyes.
- The cleaning of rooms and linens is carried out using non-toxic detergents.

Additional information: Deborah Bernstein, Starwood Hotels and Resorts,
E-mail: deborah.bernstein@starwoodhotels.com

5. SOLID WASTE MANAGEMENT METHODS

5.1 Waste Audits

Before management can select appropriate waste management methods, an assessment (audit) of the facility's waste stream must be conducted. A waste audit guides an individual/team through the steps required to provide data on the composition and quantity of waste generated, disposed of and recycled. An audit can also supply information required to help design an effective solid waste management program. Typically a waste audit can be divided into two major steps.

Step 1: Determine the Current Volume of Solid Waste Being Produced at a Facility

An initial step in assessing a facility's solid waste management situation is to determine the actual levels of solid waste being produced. Depending on the scale of a facility and the sophistication of its management and staff, the assessment can be done on an overall basis (i.e. waste from the overall facility) or dealt with at a high level of precision (i.e. assessment by activity). In larger-scale facilities, this evaluation should be carried out in areas such as food and beverage, accommodation and groundskeeping. This provides a facility with an assessment of its solid waste situation before considering and possibly introducing solid waste management procedures.

The form below can be used to collect information and subsequently measure improvements in solid waste management practices on a yearly basis. The current situation can be assessed using the factors identified in Table 1. Quantities of waste can be determined as:

- volume and/or weight
- percentages of the total waste stream
- cost of different waste management techniques.

Material	Recycled	Reused On-site or Off-site	Sent to Landfill Site	Composted	Disposed of by Combustion
Paper					
Plastics					
Glass					
Metals					
Organic materials					
Textiles					
Demolition and construction debris					
Chemicals and products with chemical components					
Rubber and rubber products					
Human/animal waste					
Other/s					

Table 1: Quantity of Waste by Different Waste Management Techniques

Step 2: Assess Whether Higher Rates of Reuse and Recycling Can Occur

This step calculates the estimated percentage of waste which could be recycled or is currently being recycled by identifying areas requiring improvement. The facility operator can estimate the savings based on the introduction of more sustainable approaches to waste management.

5.2 Solid Waste Management Methods

Solid waste, although diverse in nature, is “often a recoverable source” and can be profitable if effective waste disposal management techniques are used. A variety of waste management options exist including waste reuse, recycling, recovery and disposal (Figure 5).

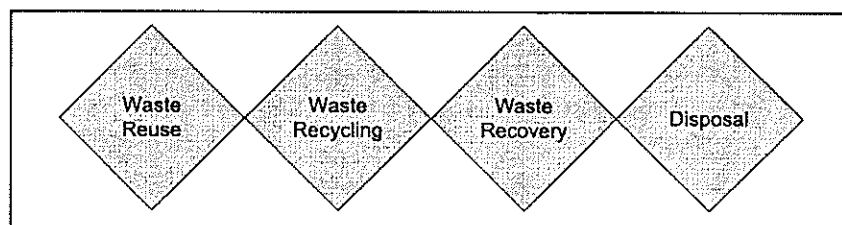


Figure 5: Solid Waste Management Options

5.2.1 Waste Reuse and Recycling

To effectively reuse and recycle waste, segregation is essential in sustainable waste management practices. If paper becomes mixed with food waste, for example, it is difficult to reuse food waste either for animal feed or composting. If glass bottles or feces are mixed with food, it is difficult to recycle the material without health risks. If toxic chemicals are mixed with food waste, composting is impossible.

Waste Reuse

Reusing items by repairing, selling or donating these to charity and community groups reduces waste. Reuse is preferable to recycling since the item does not need to be reprocessed. In addition to environmental considerations, sensitive reuse schemes can have important social and cultural benefits. Here are a number of ways a facility can reuse items:

Accommodation

- Collect used flowers from guest rooms for composting or (if appropriate) donating to local hospitals, schools or charitable organizations.
- Donate used linens, towels and blankets to local charities.
- Install a dispensing system for products such as shampoo, soap and lotions.
- Donate soap used and toiletries to local charities.
- Dye stained towels a dark color for reuse as cleaning rags.
- Use old linens to make aprons or cleaning rags.
- Give old magazines to employees, charities, schools or hospitals.
- Donate the old furniture and equipment to charities.
- Reuse waste paper as telephone answering pads or notes.

Food and Beverage

- Donate empty buckets to schools or employees for storage.
- Donate old utensils and kitchenware to employees or charities.
- Have old refrigerators/appliances repaired/rebuilt.

Maintenance of Open Spaces and Grounds

- Donate older equipment to employees or charities.

Administrative and Office Functions

- Reduce paper use, e.g. double-sided photocopying.
- Donate old computers and equipment to schools or charities.
- Reuse bubble wrap and foam packaging for shipping.
- Re-label and reuse cardboard boxes for shipping.
- Use refillable, reusable toner cartridges for laser printers.

Case Study: Four Seasons Resort Maldives at Kuda Huraa

The resort has recycling, waste separation and staff educational programs in place. It features its own desalination plant and a modern water treatment system. All used water is properly treated and used entirely for landscaping purposes. Landscaping waste is used for composting. Effort has been made in minimizing the use of plastic and other non-biodegradable materials throughout the resort. A mini incinerator is used to reduce the amount of materials exported from the island and the resort is working with the neighbouring island community of Bodu Huraa by sponsoring a waste incineration program and a water treatment study which is currently being conducted with the aim of improving the island's threatened fresh water supply. In-bungalow amenity bottles are ceramic and refillable with biodegradable products.

Additional information: Four Seasons Resort Maldives, North Male' Atoll, Republic of Maldives, Tel: (960) 444-888

Waste Recycling

Recycling turns materials that would otherwise become waste into valuable resources with environmental, financial and social benefits. Recycling diverts waste from landfills, saves energy and water and creates less air pollution.

Simple techniques can be implemented as part of a successful recycling program:

- Contact local recyclers to identify items/areas in which they are interested.
- Collect used flowers in guestrooms for composting.
- Put recycling containers in guestrooms to be emptied regularly by housekeeping staff.
- Provide recycling bins in kitchen/bar areas for glass, aluminum and plastic containers.
- Collect and separate cans, bottles, glass and cardboard for recycling.
- Recycle motor oils, antifreeze, paint, etc. used by groundskeeping and maintenance staff.
- Recycle all office paper and cardboard boxes.
- Recycle office materials, e.g. copier and printer cartridges.

Case Study: Hard Rock Café – Las Vegas, Nevada

Recycling containers have been placed throughout the restaurant and kitchen areas in order that materials can be separated during the day rather than after the close of business. All employees are expected to take part in the recycling program in order to ensure a direct impact on its success.

Results: Frequent sorting is more effective because it saves time, man-hours and ensures waste is handled only once. The program has diverted 75% of the facility's waste to recycling and reduced the number of weekly garbage pick-ups from seven to three days a week. Savings in waste hauling fees is USD 18,000 per year.

Additional information: <http://ndep.nv.gov/recycl/recivhr.htm>

5.2.2 Waste Recovery

Composting

Much of the waste generated from food and beverage departments is biodegradable and can be composted rather than sent to a landfill. "Composting" can be defined as managing natural processes in a deliberate and organized way. Within the composting process bacteria helps convert complex organic matter into carbon dioxide, water, plant nutrient and humus. Experience has shown that plants grown using compost are less prone to pest attack and disease.

Organic wastes can be composted in a number of ways from backyard bins to large centralized facilities. At each level, the principles are the same even though composting rates, feedstock types, tonnages, control methods and composting systems are different. Common types of system include static piles, windrows, aerated piles, channels, rotary drums, large vessels and many kinds of hybrid systems.

The compost pile should be prepared away from public areas, with a gentle concrete slope and drainage channels leading to a leachate holding tank. The pile needs to be well aerated for effective composting since oxygen is vital. Large chunks of material such as wood chips are then added to the bulk and aeration starts the composting process. It usually reduces the bulk of the original material by 40 to 50%. Composted solid waste has great potential since it:

- reduces the amount of waste sent to landfill.
- reduces organic materials in the effluent treatment process.
- produces rich material for gardens and grounds.
- enhances the environmental profile of a tourism destination.

Case Study: Implementation and Demonstration of Composting Practices in Hotels - Hua Hin, Thailand

Composting options to deal with solid waste were introduced in five hotels in Hua Hin, Thailand, by the Canadian Universities Consortium Urban Environmental Management (CUC UEM) Project, funded by the Canadian International Development Agency (CIDA), and implemented in association with the Thailand Environment Institute (TEI). Technical assistance from Canadian experts provided hotel staff with classroom sessions and hands-on-training on composting practices. Composting was started in spaces around the hotels with the aim of producing good quality compost to be used for the hotels' grounds.

The project team assisted the hotels to establish source waste separation systems. Posters were produced to raise staff awareness about environmental duties/responsibilities. The manager of the Metthavalai Hotel, Cha Am, used proceeds from the sale of recyclable waste to support a revolving fund for the hotel staff to take low interest loans out of the fund for their personal purposes such as health care, children's education, and maintenance of their houses especially in the monsoons. The loans have created an incentive for staff involvement in waste management practices at the hotel.

Additional information:

<http://www.ucalgary.ca/UofC/faculties/EV/designresearch/projects/cuc/tp/demo.htm>

Combustion

When all other options have been considered, combustion or burning waste at high temperatures can be an effective way to deal with certain types of solid waste, especially where land is at a premium for land fill or composting purposes especially in small island states. The main residue from incineration is slag. The amount of slag generated depends on the ash content of the waste which must be disposed of properly in well-constructed landfill areas. Small-scale or non-professionally managed combustion operations are not recommended since hazardous gases can be produced if the wrong type of waste material is burned.

In any combustion situation, non-combustible material such as metals and glass must be removed to reduce the size of the treatment system and increase the system's energy efficiency. The combustion system should be designed to hinder, where possible, the formation of pollutants, especially NO_x and organic compounds, e.g. dioxins.

If possible, a combustion process should consider an energy recovery system with the possibility of reusing waste as fuel for energy production, while heat can be recovered in a boiler system and converted to hot water, steam or electricity.

Case Study: Fairmont Hotels & Resorts Green Partnership Program

Fairmont Hotels & Resorts, the largest luxury hotel company in North America, operates 39 properties in six countries – United States, Canada, Mexico, Bermuda, Barbados, Hawaii and the United Arab Emirates. It incorporated an aggressive, highly innovative environmental program in its daily activities in 1990. It has been recognized as the most comprehensive in the North American hotel industry, according to *National Geographic Traveler* magazine.

Waste Management: All Fairmont hotels & restaurants implemented comprehensive recycling programs using the 3 R's (reduce, reuse, recycle) with a target of reducing landfill waste by 50% and paper use by 20%. Where facilities exist, Fairmont annually diverts thousands of pounds of materials such as glass, aluminum, plastic, newspaper, cardboard and compost to recycling depots and donates used soaps and amenities to local shelters and charities.

Purchasing: Fairmont established corporate policies for the purchase of environmentally-friendly products including the elimination of hazardous chemicals and synthetic perfumes, conversion to unbleached craft and recycled paper and replacement of aerosol products with ozone-friendly alternatives. Partnerships were formed with local organic growers to purchase their products and with suppliers to eliminate/reduce excess packaging.

Other Program Activities:

- Diverting thousands of meals (untouched food) to people in need through partnerships with local shelters, food banks and soup kitchens.
- Donating thousands of used but serviceable items (including beds, furniture, amenities and linens) to shelters. The program also encourages other corporations to identify materials that may be useful to charitable organizations.
- Exploring ways to divert up to 50% of the current waste stream through industrial composting including vegetable peelings, coffee grinds, egg shells and other organic waste, resulting in a rich fertilizer used to grow herbs in organic herb gardens on the properties.

Additional information: Fairmont Hotel Vancouver, Department of Environmental Affairs,
E-mail: environment@fairmont.com

5.2.3 Disposal

There will always be residual waste which cannot be reduced, recycled or reused. The major disposal option for this waste is in a municipally or privately managed facility or in the case of remote and small island states on the facility's site itself. Operators of these facilities must ensure that the waste does not damage the environment or harm area residents by using accepted solid waste management landfill procedures.

More Information

For further case studies/good practices on waste management in the hospitality industry please see "Sowing the Seeds of Change - An Environmental Teaching Pack for the Hospitality Industry", a joint publication of UNEP, the International Hotel and Restaurant Association (IH&RA) and the International Association of Hotel Schools (EUHOFA International), page 98, 129-149.